

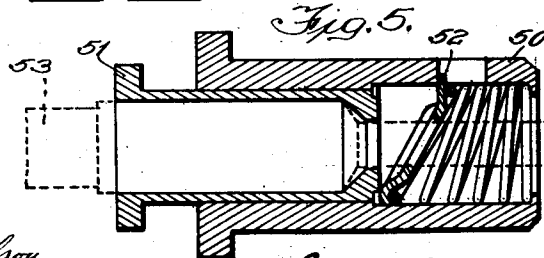
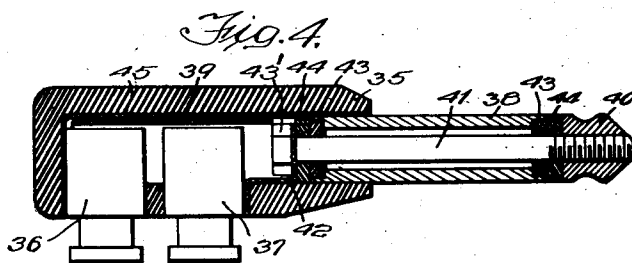
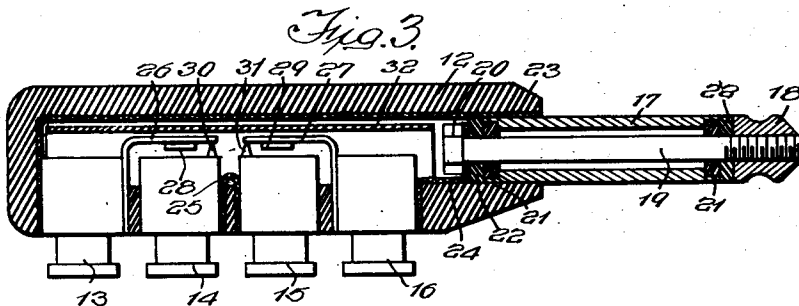
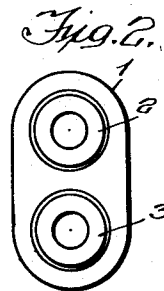
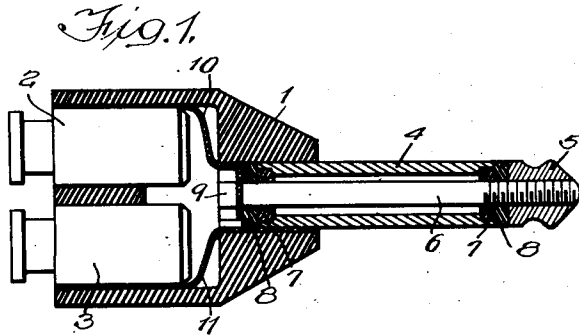
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AUTOMATIC PLUG

Filed Sept. 5, 1925



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AUTOMATIC PLUG

Application filed September 5, 1925. Serial No. 54,593.

My invention relates to telephone plugs of the type in which the terminals or tips of the connecting cord may be readily connected or disconnected by simple manual operations not requiring tools. Such plugs are commonly termed "automatic plugs".

According to my invention, I employ an automatically operating spring clutch terminal or jack which is self-contained and compact. Such spring clutch terminal or jack is shown and claimed per se in my copending application, Serial No. 48,265, filed August 5, 1925.

This clutch or jack is in the form of a cylindrical sleeve with a concentric cylindrical sleeve release member projecting from the end thereof. That is to say, the release member is co-axial with the body of the clutch or jack and projects from the end thereof about the conductor or tip of the connecting cord or wire.

Because of such shape the clutch terminals or jacks may be disposed in parallel relation in an insulating handle giving a neat and compact device.

Also because of the self-contained character of the clutch elements, I am able to make the handle of a single piece of insulating material of very simple and inexpensive character easily produced, as, for example, from a block of fiber or easily moulded in a simple mould in a single piece.

In conjunction with the above, I employ a construction of plug contacts such as disclosed in my copending application, Serial No. 24,002, filed April 18, 1925, which provides a self-contained cylindrical assembly which may also be disposed in the handle of the plug by a press fit in a cylindrical hole in the plug handle.

Since the clutch terminals and the plug contact are self-contained and self-supporting, they may be connected by simple flexible conductors within the handle of the plug. These conductors may be held in contact with the respective parts by friction being held between the side walls of the holes and the cylindrical parts fitting into the same.

Obviously, the cylindrical parts may be

threaded into the handle piece, but I find that close push fits are sufficient.

The plug may have contact clutches or jacks for only one pair of conductor tips or for placing a plurality of receivers in series.

Now, in order to acquaint those skilled in the art with the manner of constructing and operating a device employing my invention, I shall describe in connection with the accompanying drawings a specific embodiment of the same.

In the drawings:—

Fig. 1 is a longitudinal section of an automatic plug of my invention;

Fig. 2 is a front elevational view of same;

Fig. 3 is a longitudinal section of another embodiment which illustrates the manner of constructing an automatic plug where one or more head sets or other pieces of apparatus are to be connected thereto;

Fig. 4 is a longitudinal section of an embodiment similar to the one shown in Fig. 3, but which is adapted to receive only one pair of cord tips; and

Fig. 5 is a sectional view of a jack which is more fully described in the co-pending application above referred to.

In the preferred form of my automatic plug which I illustrate in Fig. 1, I employ a unitary housing or body member 1 which may be of fiber, hard rubber, or what is commonly known and sold under the trade name of "bakelite". I preferably make this handle of fiber because of its strength and cheapness. The housing 1 may be of any desired size or shape without departing from the spirit of the invention. It is provided with a pair of substantially cylindrical openings offset from the central arm at one end to receive the jacks 2 and 3, and a centrally disposed opening at the opposite end to receive the sleeve 4. The openings for the jacks 2 and 3 and the sleeve 4 may be made by drilling them in a suitable fixture in which the housing 1 may be secured. Or, the housing 1 may be moulded, in which case suitable cores could be used so as to provide for the necessary openings.

The housing or handle is preferably made

of a unitary piece of insulating material because this permits of a more neat and compact structure, but I do not intend to be limited to a unitary housing as it obviously may be made up of separate parts.

The novel manner of securing the tip 5 to the sleeve 4 is more fully described in my co-pending application on plug, Serial No. 24,002, filed April 18, 1925, heretofore referred to. As shown, the tip 5 is threaded on a needle member 6 which is insulated from the sleeve 4 by means of suitable insulating washers 7 and 8 at opposite ends of the sleeve. It will be noted that the opposite ends of the sleeve 4 are counterbored to receive the washers 7. By this construction, the need for a tubular insulating member throughout the entire length of the sleeve is eliminated.

The opposite end of the needle 6 threads into a nut 9 under which there is clamped one end of a flexible conductor 10. A similar flexible conductor 11 is secured between the outer wall of the sleeve 4 and the opening provided therefor in the housing 1 by making the opening of such size that the sleeve 4 will have to be forced into the opening, when the conductor 11 is placed therein, by means of a press fit. The openings for the jack members 2 and 3 are also of such size that the jacks may be forced therein by a press fit when the conductor members 10 and 11 are placed therein. In this way the conductor 10 electrically connects the jack 2 with the tip 5 by means of the needle 6 and nut 9. Similarly, the conductor 11 electrically connects the jack 3 with the sleeve 4. Both the conductors 10 and 11 are made of flexible conducting material, preferably a thin ribbon of braided copper. The ends of the conductors may be soldered to the respective parts if desired. The flexible conductors may be made long enough so that they may be threaded through the block and soldered to the clutches and to the plug contacts and thereafter the clutches and plug may be forced into the holes, the conductors being merely folded or crumpled up inside the block. In such case the central parts of the conductors are insulated.

In the embodiment shown in Fig. 3, the housing 12, which is also a unitary structure, is also provided with suitable openings for the jacks 13, 14, 15 and 16 and the sleeve 17. All of these openings may be formed by suitable drilling operations, or by molding the member 12 and providing suitable cores in the mold. The tip 18 is likewise secured to the sleeve 17 by means of the needle 19 and the nut 20. Suitable insulating washers 21 and 22 at opposite ends of the sleeve serve to insulate the sleeve from the needle and tip respectively. The sleeve 17 is also adapted to be inserted into the opening provided therefor in the housing 12 by means

of a press fit so as to hold the flexible conductor member 23 firmly in contact with it. The opposite end of the conductor member 23 is firmly held in contact with the outer wall of the jack 13 in a similar manner. The flexible conductor member 24 serves to electrically connect the needle 19 with the outer wall of the jack 16. This member is likewise held in firm contact with the outer wall of the jack 16 by securing the jack in the opening provided for it in the housing 12 by means of a press fit. A flexible conductor member 25 serves to electrically connect the outer walls of the jacks 14 and 15 with each other. To the outer surfaces of the jacks 13 and 16, adjacent the jacks 14 and 15, are secured the spring members 26 and 27, respectively, by being pressed in between the outer wall of the jack and the inner wall of the housing. Each of the spring members 26 and 27 has secured to it insulating discs or washers 28 and 29 in line with the openings in the jacks or clutches 14 and 15 to be engaged by pin terminals which may be inserted in said jacks 14 and 15. A pair of contacts 30 and 31 are secured to the outer walls or thimble portions of the jacks 14 and 15, and are normally in contact engagement with the spring members 26 and 27. A sheet of thin fiber or other insulating material 32 serves to insulate the jacks and the spring members from the conductor 23.

The plug shown in Fig. 3 is particularly adapted for use in connection with telephone head sets which are to be connected in series. When in use, the tip members at the end of the flexible cord connection to the head sets, are inserted in either the jacks 13 and 14, or the jacks 15 and 16. If one head set is used and the cord tips are inserted in the jacks 13 and 14, the tip inserted into the jack 14 will bear against the insulating member or washer 28 and force the spring 26 out of contact with the contact member 30. In this way the cord tips in the jack 13 will be electrically connected to the sleeve member 17. The cord tip in the jack 14 will, on the other hand, be electrically connected with the tip 18. If it is desired to use another head set in series with the one connected to the jacks 13 and 14, the cord tips thereof will be inserted in the jacks 15 and 16. By inserting one of the cord tips in the jack 15, it will bear against the insulating washer 29 secured to the spring member 27 and force the spring 27 out of contact with the contact member 31. In this way, both head sets will be connected in series with the sleeve 17 and the tip 18. Obviously, more than the two pairs of jacks illustrated in Fig. 3 may be used. This may be done by making the housing 12 larger and providing the number of openings therein equal to the number of jacks which are to be used. Each pair of jacks will have a spring member and a contact

member adapted for engagement therewith for cutting the corresponding pair into circuit.

The conductor member 23 is, in each case, connected to the jack farthest away from the sleeve 17. It will also be noted that the embodiment shown in Fig. 3 is not limited to having the apparatus connected to jacks connected in series, as the connections between the jacks may be so arranged as to have the apparatus connected thereto in parallel and not in series.

Fig. 4 shows an embodiment of the invention which is similar to that shown in Fig. 3, except that it employs only one pair of jacks. In this embodiment, the unitary housing 35 is provided with suitable openings for the jacks 36 and 37 and the sleeve 38. The jack 36 is connected electrically to the sleeve 38 by means of the flexible braided conductor 39, while the jack 37 is electrically connected to the tip 40 at one end of the needle 41 by means of a like conductor member 42 and the nut 43', which is adapted to secure the conductor 42 firmly in contact with the needle 41. Suitable insulating washers 43 and 44 prevent any possible contact between the needle 41 and the sleeve 38. An insulating member 45 serves to prevent any possible short circuit between the jacks 36 and 37 by the conductor member 39 when the jacks are pressed into position in the housing 35.

The jack or clutch which is used in each of the embodiments described, is shown in section in Fig. 5. It comprises a thimble 50 in which is mounted for slidable engagement a releasing sleeve 51. A shackle element or clutch member 52 serves to grip the cord tip which is shown in dotted lines and designated by the numeral 53, and also to hold it firmly in contact with the inner wall of the sleeve 51. The cord tip 53 may be released from the binding action of the element 52 by pressing down on the sleeve member 51 which unshackles the pin terminal. It will be noted that the end of the tip extends beyond the end of the thimble 50. This is done in order to permit the tip when used in plugs of the type shown in Fig. 3, to bear against the insulating members 28 and 29 so as to bring the standard members out of engagement with their cooperating contact members, but otherwise it is not necessary.

Due to the compact arrangement of the jack or clutch and its releasing element, the terminals may be brought very close to each other without danger of cross connection and without clamping the releasing elements. While the jacks or terminal clutches are shown as circular cylinders, it is to be understood that the shape may be varied without losing certain of the advantages of the present invention.

I do not wish to be limited to the details shown or described.

I claim:—

1. In combination, a unitary housing having a centrally disposed opening and a plurality of openings offset from the central axis thereof, a plug assembly adapted for mounting in said centrally disposed opening, a plurality of jack members having sleeves adapted for mounting in the offset openings of said housing, clutch means wholly enclosed within said sleeves and adapted to act independently thereof, and means secured between the walls of said housing and said sleeves for electrically connecting said jacks with said plug assembly.

2. In combination, an insulating housing having a plurality of openings at the front end and a single opening at the back end, a sleeve secured within said single opening, a tip mounted on said sleeve and insulated therefrom, a plurality of automatic jack members secured in the openings at the front end of said housing, and flexible conductor means connecting said tip and sleeve with said jacks, said conductor means being tightly embraced by said jacks.

3. In combination, a single unitary housing having a plug opening and a jack opening, a plug assembly mounted in said plug opening, a jack member including a sleeve adapted for mounting in said jack opening by means of a press fit, said jack member including clutch means in said sleeve and operable independently of the housing for gripping and releasing an electrical conductor, and means for connecting the jack to the plug including a flexible conductor disposed within the housing and having a portion positioned between said sleeve and the wall of the jack opening, said flexible conductor being held in place by said press fit.

4. In combination, a one-piece unitary housing having a plug opening and a plurality of jack openings, said housing having an intermediate opening disposed between and connecting said plug and jack openings, a plug in the plug opening and extending longitudinally from said housing, jacks mounted in said jack openings, said jacks being disposed generally transversely of the direction of extension of the plug from the housing and arranged side by side longitudinally of the housing and exposed transversely through one side of the housing, and conductor means disposed in said intermediate opening and connecting said plug and jacks.

5. In combination, a single unitary housing having a plug opening and a plurality of jack openings, said housing having an enlarged internal recess disposed between the plug and jack openings and connecting the jack openings with each other and each with said plug opening, a plug in the plug opening and extending longitudinally from said housing, jacks mounted in said jack open-

ings independently of said plug, said jacks being disposed generally transversely of the direction of extension of the plug from the housing and arranged side by side longitudinally of the housing and exposed transversely through one side of the housing, and conductor means disposed in said intermediate opening and connecting said plug and jacks.

6. In combination, a housing having plug openings and a plurality of jack openings, said housing having an intermediate opening disposed between and connecting said plug and jack openings, a plug in the plug opening, jacks mounted in said jack openings, and conductor means disposed in said intermediate opening and connecting said plug and jacks, said conductor means fitting and held in said jack openings between the wall of the housing surrounding said openings and the external peripheries of the jacks.

7. In combination, a single unitary housing having a central enlarged bore, a plug opening extending from one side of said bore, a plurality of jack openings extending from another side of said bore, a plug in the plug opening, jacks mounted in said jack openings, and conductor means disposed in said central enlarged bore for connecting said plug and jacks, said conductor means fitting and held in said jack openings between the wall of the housing surrounding said openings and the external peripheries of the jacks.

In witness whereof, I hereunto subscribe my name this first day of September, 1925.

NEWTON C. SCHELLENGER.

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